

AMENDMENTS TO THE CLAIMS:

The following Listing of Claims replaces all prior versions and listings of claims in this application.

LISTING OF CLAIMS

1.-28. (Canceled)

29. (Currently amended) A tunable microwave arrangement, comprising:

a microwave circuit device,

a substrate, and

a layered ground plane structure disposed between the microwave circuit device and the substrate, wherein the layered ground plane structure comprises at least one patterned first metal layer, at least one second metal layer, and at least one tunable ferroelectric film layer between the at least one patterned first metal layer and the at least one second metal layer; and the layered ground plane structure comprises a multilayer structure having more than one ferroelectric film layer, each ferroelectric film layer being disposed between respective first and second metal layers.

30. (Previously presented) The tunable microwave arrangement of claim 29, wherein the at least one patterned first metal layer comprises a patterned electromagnetic band gap crystal structure.

31. (Previously presented) The tunable microwave arrangement of claim 29, wherein the at least one tunable ferroelectric film layer is patterned.

32. (Previously presented) The tunable microwave arrangement of claim 29, wherein the at least one ferroelectric film layer is not patterned.

33. (Previously presented) The tunable microwave arrangement of claim 29, wherein the at least one second metal layer is not patterned.

34. (Previously presented) The tunable microwave arrangement of claim 29, wherein the at least one second metal layer is patterned.

35. (Previously presented) The tunable microwave arrangement of claim 29, wherein the at least one second metal layer comprises platinum, copper, silver, or gold.

36. (Previously presented) The tunable microwave arrangement of claim 29, wherein the at least one tunable ferroelectric film layer comprises strontium titanate ( $\text{SrTiO}_3$ ) or barium strontium titanate ( $\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$ ).

37. (Previously presented) The arrangement of claim 29, wherein the layered ground plane structure is tunable in response to a DC voltage applied between the at least one patterned first metal layer and the at least one second metal layer.

38. (Previously presented) The arrangement of claim 37, wherein tuning the layered ground plane structure tunes the microwave circuit device without decoupling circuits on the microwave circuit device.

39. (Previously presented) The arrangement of claim 37, wherein the applied DC voltage affects a dielectric constant of the at least one patterned first metal layer, thereby changing an impedance of a surface of the layered ground plane structure adjacent the microwave circuit device.

40. (Previously presented) The arrangement of claim 29, wherein the microwave circuit device comprises at least one microstrip line.

41. (Previously presented) The arrangement of claim 29, wherein the microwave circuit device comprises a patch resonator.

42. (Previously presented) The arrangement of claim 29, wherein the microwave circuit device comprises an inductor coil.

43. (Previously presented) The arrangement of claim 29, wherein the microwave circuit device comprises a microwave transmission line.

44. (Previously presented) The arrangement of claim 29, wherein the microwave circuit device comprises a coplanar strip line device.

45. (Previously presented) The arrangement of claim 29, wherein the substrate comprises a semiconductor, a dielectric, or a metal.

46. (Previously presented) The arrangement of claim 29, wherein a dielectric having low permittivity and low loss is disposed between the microwave circuit device and a top patterned first metal layer of the layered ground plane structure.

47. (Previously presented) The arrangement of claim 46, wherein the dielectric comprises a benzocyclobutene (BCB) or other polymer.

48. (Previously presented) The arrangement of claim 37, wherein the applied DC voltage is less than about 100 volts.

49. (Previously presented) The arrangement of claim 48, wherein the applied DC voltage is less than about 10 volts.

50. (Previously presented) The arrangement of claim 29, wherein the at least one tunable ferroelectric film layer has a thickness of about 1-2 micrometers.

51. (Previously presented) The arrangement of claim 29, wherein the microwave circuit device comprises a semiconductor integrated circuit.

52. (Canceled)

53. (Currently amended) A method of tuning a microwave arrangement comprising a microwave circuit device, a substrate, and a layered ground plane structure disposed between the microwave circuit device and the substrate, the method comprising the ~~[[step]]~~ steps of applying a DC tuning voltage between a first patterned metal layer and a second metal layer disposed on opposite sides of a ferroelectric layer, wherein the layered ground plane structure comprises the layers and is a multilayered ground plane structure comprising more than two ferroelectric film layers, and selecting any of the first and second metal layers surrounding any of the ferroelectric films for tuning the microwave/integrated circuit device.

54. (Previously presented) The method of claim 53, wherein the first patterned metal layer comprises a patterned electromagnetic band gap crystal structure.

55. (Previously presented) The method of claim 53, wherein applying the DC tuning voltage changes an impedance on a top of the layered ground plane structure, thereby changing a resonant frequency of the microwave circuit device.

56. (Canceled)